

AYGAZ ARTIFICIAL INTELLIGENCE LITERACY BOOTCAMP OFFERED BY GLOBAL AI HUB PROJECT REPORT

What are the precautions that can be taken to prevent the earthquake and before and after the earthquake?

It is not possible to prevent an earthquake, but thanks to the measures that can be taken before and after the earthquake, people's safety and financial losses can be minimized. Precautions to be taken before an earthquake are as follows:

- Taking necessary measures to make buildings and structures resistant to earthquakes
- Fixing items that may fall during an earthquake
- Identifying and marking emergency exit routes
- Preparing the emergency bag and putting the necessary materials in it
- Making earthquake insurance

The precautions to be taken after the earthquake are as follows:

- First of all, life safety should be ensured and emergency services should be notified.
- One should be prepared for basic needs such as water, food, medicine.
- Volunteer to assist with rescue efforts.
- Authorities should be contacted for damage assessment and necessary repairs.

How can an AI project be developed to prevent earthquakes and to take precautions before or after an earthquake?

Similar projects may exist, but each project has its own uniqueness and can offer a different perspective. For this reason, I added my own originality to my own project by evaluating the shortcomings and pros of similar projects.

The main idea of my project is an artificial intelligence solution that makes the precautions that can be taken before and after the earthquake smarter. This solution focuses on fast and accurate data collection during an earthquake, coordination of emergency teams, ensuring the safety of people and reducing damage.

What data should be used in the AI application developed for the coordination of emergency search and rescue teams?

I want to develop solutions using artificial intelligence and machine learning for the coordination of emergency search and rescue teams. So I will use the following data to improve my project and make it useful to the user:

1. Geological data: Geological data such as the magnitude, depth, epicenter point of the earthquake, settlements and structural features of the buildings are very important in the response planning of the emergency teams. By analyzing these data by machine learning algorithms, possible damage areas can be determined and appropriate teams can be directed for emergency response.
2. Weather data: Weather is also an important factor during natural disasters. For example, weather data can be used to plan emergency teams in the event of a storm or flood. Weather forecasts can be made with machine learning algorithms and emergency response plans can be made according to these forecasts.
3. Traffic data: Emergency response teams have to reach the scene quickly during natural disasters. Traffic data can help teams get to the scene quickly. Traffic density predictions can be made with machine learning algorithms and response teams can be directed according to these predictions.
4. Social media data: During natural disasters, people can request help or share damage reports on social media. In the strong earthquakes that affected 11 cities centered in Kahramanmaraş and approximately 14 million people we have lived in since February

6th, 2023, many people took videos, photographs and audio recordings from the rubble; made their voices heard through social media. With machine learning algorithms, social media data can be analyzed and possible emergency response needs can be determined.

Using this data, I can optimize the coordination of emergency teams by developing artificial intelligence and machine learning algorithms. For example, using these algorithms, damage areas can be predicted and emergency responders can be directed to them more quickly and effectively. In addition, with traffic density forecasts, it can be ensured that the teams reach the scene more quickly.

What are some AI applications developed in the past for the coordination of emergency search and rescue teams and how do they work?

Although artificial intelligence (AI) applications for the coordination of emergency search and rescue teams in earthquakes are still new, there are few examples. Some of these examples are:

- **Microsoft Resiliency Project:** With a project launched in 2019, Microsoft aimed to assist emergency teams in natural disasters by offering an AI-based solution. Using Bing Maps and AI algorithms, the project can predict the destruction, flooding, fires and other disasters that can be caused by natural disasters.
- **Los Alamos National Laboratory:** Using AI and machine learning algorithms, Los Alamos National Laboratory has developed a tool to predict damage from earthquakes, tsunamis, and other natural disasters. This tool helps emergency teams understand where the damage was, how much, and how long it took.

- **IBM AI for Disaster Response:** IBM has developed a set of applications that assist emergency teams in natural disasters using AI technology. These apps can predict injury rates, survival rates, damage rates, and other critical information in the disaster area.

In addition to these examples, there are many academic researches and articles on disaster management and emergency management. These studies address how AI and machine learning algorithms can be used in disaster management and facilitate coordination of emergency teams.

What are the deficiencies of the projects produced for the coordination of the emergency search and rescue team in the earthquake and how can these deficiencies be completed?

The shortcomings of similar projects can be listed as follows:

1. **Lack of data:** The lack or inadequacy of pre- and post-earthquake data can make it difficult to implement such projects accurately and effectively.
2. **Appropriate algorithm selection:** Deciding which algorithm to use can directly affect the success of the project. Incorrect algorithm selection can result in misinterpretation of data.
3. **Lack of real-time response:** Because earthquakes occur quickly and suddenly, response and coordination need to be done quickly. However, many AI projects may not be sufficient to respond in real time.
4. **Getting the right results:** Artificial intelligence applications can sometimes give wrong results. This may result in incorrect interventions or incomplete information.

To overcome these shortcomings, the following factors should be considered during the design phase of my project:

1. Data collection: Collecting sufficient and accurate data supporting the project will directly affect the success of the project. Collecting, analyzing and using data before and after the earthquake ensures that the artificial intelligence application works correctly.
2. Algorithm selection: When deciding which algorithm to use, the most appropriate algorithm should be selected according to the objectives of the project and the nature of the data.
3. Real-time response: Since earthquakes occur quickly, the real-time response capability of artificial intelligence applications needs to be increased.
4. Accurate results: In order for artificial intelligence applications to produce correct results, correct data must be used and algorithms must be applied correctly. In addition, the accuracy of the results should be checked periodically and the algorithms should be corrected when necessary.

Conclusion

As a result, artificial intelligence technologies and machine learning algorithms can be very effective in preventing earthquake disasters or reducing their effects. While the precautions that can be taken before and after the earthquake are critical to prevent loss of life, the coordination of the emergency teams and data analysis are also necessary for a fast and effective response.

Within the scope of this project, I propose to develop an artificial intelligence-based system to improve the coordination of emergency teams. This system can perform post-earthquake damage analysis using real-time data, manage the resources of emergency response teams, and identify people in the affected areas.

Paying attention to the shortcomings of similar projects, I would like to underline that critical issues such as people's privacy and data security should be given special attention in my project. In addition, taking into account the feedbacks of the emergency teams during the implementation phase of the project will help correct the problems and deficiencies in the system development process.

As a result, with this project, it is aimed to use artificial intelligence technologies effectively in earthquake disasters and to improve the coordination of emergency teams. This project can offer an important solution not only to earthquake disasters in Turkey, but also to similar disasters around the world.

Bibliography

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All document is prepared by ECE ÜLKÜ.

A handwritten signature in black ink, appearing to read 'ECE ÜLKÜ', is positioned in the center of the page.